

Remarks

Applicant appreciates and requests reconsideration of the pending claims by the Examiner.

Applicant had a phone interview with the Examiner on July 16 at 9:45 to clarify the Examiner's second rejection. The Examiner stated to Applicant that the second rejection should read Nielson '964 or Haase '435 in view of Field '910.

Applicant appreciates time of the Examiner for that clarification.

Claim List – Status and Support of Current Amendment Changes

Claim	Status	Type	Support for Current Changes
1	Pending	Method	There are no changes in this amendment.
2	Pending	Method	There are no changes in this amendment.
3	Pending	Method	There are no changes in this amendment.
4	Pending	Method	There are no changes in this amendment.
5	Pending	Method	There are no changes in this amendment.
6	Pending	Method	There are no changes in this amendment.
7	Pending	Method	There are no changes in this amendment.
8	Pending	Method	There are no changes in this amendment.
9	Pending	Method	There are no changes in this amendment.
10	Pending	Method	There are no changes in this amendment.
11	Pending	Method	There are no changes in this amendment.
12	Pending	Method	There are no changes in this amendment.
13	Pending	Method	There are no changes in this amendment.
14	Cancelled	N/A	N/A
15	Pending	Method	There are no changes in this amendment.
16	Pending	Composition	There are no changes in this amendment.
17	Pending	Composition	There are no changes in this amendment.
18	Pending	Composition	There are no changes in this amendment.
19	Pending	Composition	There are no changes in this amendment.
20	Pending	Composition	There are no changes in this amendment.
21-38	Cancelled	N/A	N/A
39	Pending	Composition	There are no changes in this amendment.

Applicant's Response to Examiner's 35 USC § 103(a) Rejections**Stover in view of Haase**

In response, Applicant respectfully presents to the Examiner that at the time of the instant patent application, one of ordinary skill in the art would have available, which is of record, Dentel, Steven K. and Chitikela, Srinivasarao; *Evaluation of Dual Chemical Conditioning and Dewatering of Anaerobically Digested Biosolids The Final Report Sludge Dewaterability Assessment for East Bay Municipal Utility District (EBMUD) California*, June 1995 (Dentel 1995).

Within Dentel 1995, there are many arguments presented which teach away from the instant claims. Specifically:

1. On page 2 is stated,

"The inorganic conditioners require dosages up to 20% on the solids basis and **typically cannot produce the solids concentrations in dewatered biosolids that are attainable with much lower dosages of polymer** [e.g. cationic polyacrylamide].

Thus, **in spite of their higher unit cost, organic polymers have largely displaced inorganic chemicals in sludge conditioning and dewatering processes**. U.S. polymer sales for this purpose are estimated at \$130 million per year (Dentel et al., 1995). The expense of polymer purchases is usually the greatest single cost component in biosolids management, and thus represents a considerable portion of overall treatment costs. At some treatment facilities where polymer demand is unusually high, this expense may even exceed secondary treatment aeration costs." **(Emphasis added)**

2. On page 6 is stated,

"Figures 1 and 2 show the results of conditioning and dewatering results for both the EBMUD and Philadelphia sludges, when conditioned with Percol 757, ferric chloride, or HDTMA individually. These results once again confirm that cationic polymers are very effective in sludge conditioning when compared to the inorganic chemical conditioning with ferric chloride." **(Emphasis added)**

3. On page 7 is stated,

"Two dosages of ferric chloride, approximately 1500 and 3000 mg/L, were selected for use in preconditioning of EBMUD sludge. These dosages were at roughly 25% and 50% of the optimum dose for ferric chloride alone, and low enough to avoid significant pH change. In a similar manner, two dosages of ferric chloride,

approximately 1300 and 2500 mg/L, were selected for dual conditioning and dewatering of the Philadelphia sludge. In the case of HDTMA, doses of 1000 and 2000 mg/L were selected with reference to the results in Figures 1 and 2. Conditioning and CST tests were then performed varying the dose of Percol 757 [e.g. cationic polyacrylamide] that followed the ferric chloride or HDTMA.

Figures 6 and 7 show the CST results after dual chemical conditioning of EBMUD and Philadelphia sludges respectively. Figures 8 and 9 show the SC values for the same experiments."

4. And, then, on page 10 is stated,

"Although preconditioning with ferric chloride reduced the cationic polymer requirement, these results indicate that the process was not cost effective." (**Emphasis added**), while in conclusion

5. On page 11 is stated,

"The use of ferric chloride or HDTMA (a quaternary salt) as a preconditioner can reduce the polymer requirement, but this is not a cost effective option at current prices for these additives." (**Emphasis added**)

Therefore, Dentel 1995 teaches that the economic (cost) viability of the results presented in figure 8 and 9 is not effective, therein stating "the process was not cost effective" and that "this is not a cost effective option". Given the significant cost considerations, as previously presented in Dentel 1995, e.g. item 1 above, Dentel 1995 teaches away from the use of an iron salt in combination with a cationic polyacrylamide in the dewatering of biosolids.

Second, Applicant would like to respectfully present to the Examiner that the cited reference, Chitikela, Srinivasarao and Dentel, Steven K.; *Evaluation of Dual Chemical Conditioning and Dewatering of Anaerobically Digested Biosolids*, 10th Annual Residuals & Biosolids Management Conference: 10 years of Progress and a Look Toward the Future, August 18-21, 1996 (Chitikela 1996), comprises the same teachings as Dentel 1995. Specifically,

6. On page 11-25 is stated,

"In the past, ferric chloride was more commonly used in conjunction with lime, but the current practice is generally to use cationic polymers (polyelectrolytes) [e.g. cationic polyacrylamides] alone. The inorganic conditioners require doses of up to 20 percent on a dry solids basis and typically cannot produce the solids concentrations in

dewatered biosolids that are attainable with much lower dosages of polymer (approximately 1 percent on a dry weight basis)." **(Emphasis added)**

7. On page 11-26 is stated,

"**Methods:** i) Conditioning of sludges was conducted the general procedure given in the Guidance Manual for Selection of Polymers in Wastewater Treatment (WEF, 1993), ii) Conditioning and dewatering of sludges by Percol 757, ferric chloride, or HDTMA alone: A representative 0.5L volume of each sludge was placed in a 1.0 L beaker and rapidly mixed with the household blending mixer for 6-7 seconds after addition of the specified dose of Percol 757, ferric chloride, or HDTMA. Then using the jar test apparatus, rapid mixing was conducted for 20 seconds at approximately 117 RPM, and finally, the suspension was flocculated at approximately 28 rpm for 2 minutes. The suspension's pH, CST and streaming current (SC) values were then measured."

8. Then, on page 11-27 is stated,

"Comparison of results of single conditioner dosages. Figure 1 provides the results of conditioning and dewatering results for the EBMUD sludge, when conditioned with Percol 757, ferric chloride or HDTMA individually. These results once again confirm that cationic polymers are very effective in sludge conditioning when compared to the inorganic chemical conditioning with ferric chloride. ... To obtain a CST of approximately 10 seconds, the required Percol 757 additions for EBMUD and Philadelphia respectively were 0.215 and 0.180 g/L or, on a mass per mass basis, 10 and 7.5 kg/Mg (i.e., 1% and 0.75% respectively). The ferric chloride additions never reduced the CST to 10 seconds for either sample, but to provide a CST of 15 seconds the doses were 6.0 and 5.2 g/L respectively (280 and 215 kg/Mg and which are 28% and 21.5% respectively). In the case of HDTMA, at a dose of 7.0 g/L the final CSTs of both EBMUD and Philadelphia sludges were reduced to 32 and 27 seconds respectively. **(Emphasis added)**

9. On page 11-28 is stated,

"Evaluation of results of dual conditioning. Two dosages of ferric chloride, approximately 1.5 g/L (the smaller dose) and 3.0 g/L (the larger dose), were selected for use in preconditioning of EBMUD sludge. These dosages were at roughly 25% and 50% of the optimum dose for ferric chloride alone, and low enough to avoid significant pH change. In a similar manner, two dosages of ferric chloride, approximately 1.3 g/L (the smaller dose)

and 2.5 g/L (the larger dose), were selected for dual conditioning and dewatering of the Philadelphia sludge. Figure 2 shows the CST results after dual chemical conditioning of EBMUD sludge. The SC results for the same experiments are presented in Figure [3]. Comparison of these results showed that a streaming current reading between -20 and -25 corresponded to the optimal dose of the conditioner. Unlike the comparisons between single conditioning chemicals (Figure 1), the CST values attained with the conditioner combinations all converged to a similar weight polymer is needed to attain this result, although the polymer, ferric chloride, or surfactant is adequate to accomplish the initial degree of charge neutralization.

Of course, the feasibility of such a substitution depends on the actual amounts of each chemical required and the corresponding costs. Tables 1 and 2 show the pounds of Percol 757 and ferric chloride, and Percol 757 and HDTMA required to give a CST of 10 seconds, which is assumed to correspond to satisfactory dewaterability. ... As seen in these tables, either ferric chloride or HDTMA can reduce the Percol 757 requirement significantly. As a rule of thumb, it appears that adding a proportion of one chemical's optimum dosage changes the requirement of the other by the same amount. For example, the optimum dosage of ferric chloride if used alone in conditioning the EBMUD sludge is about 0.56 g/L; adding 50% of this dosage reduced the polymer (e.g. cationic polyacrylamide) to about 50% of its dosage if used alone. If this rule were empirically true, it would always be most economical to use only one of the conditioning chemicals by itself.

... Table 3 shows the resulting costs of polymer (e.g. cationic polyacrylamide) itself in dewatered solids, and Figure 4 shows total conditioner cost (Percol 757 plus ferric chloride) as a function of the initial dose of ferric chloride. ... Although preconditioning with ferric chloride reduced the cationic polymer requirement, these results indicate that the process was not cost effective. The same conclusion is likely to apply in general since the relative costs of ferric chloride and the polymer (e.g. cationic polyacrylamide) would have to change substantially to alter the trend shown in Figure 4." **(Emphasis added)**

10. And on page 11, the conclusion, states,

"The use of ferric chloride or HDTMA (a quaternary salt) as a preconditioner can reduce the polymer requirement, but this is not a cost effective option at current prices for these additives." **(Emphasis added)**

Therefore, in a similar manner to that of Dentel 1995, Chitikela 1996 teaches away from the use of an iron salt as a preconditioner to a cationic polyacrylamide in the dewatering of biological solids. And, therefore, both Dentel 1995 and Chitikela 1996 teach away from the instant claims, ref. MPEP 2145 D, MPEP 2145 X and KSR International v. Teleflex, Inc. et al., No. 04-1350, 550 U.S. ___(2007).

The above is while Dentel 1995 on page 2, first paragraph, states:

"The means by which chemical conditioners interact with the colloidal phase in biological suspensions to facilitate the release of water is poorly understood, with the optimal amounts and types of conditioners required depending on a variety of factors. These include both aqueous and surface chemistries of the sludge, and the physical properties of the suspended solids, which are determined by characteristics of the original wastewater and by the operational parameters for the various treatment processes employed with the plant. Also important is the chemistry of any chemical conditioner used, and how it interacts with the biosolids." (Emphasis added)

And, Chitikela 1996 states on page 11-25,

"The optimal chemical conditioning and dewatering of a municipal sludge is a challenging task. The means by which chemical conditioners interact with the colloidal phase in biological suspensions to facilitate the release of water is poorly understood, with the optimal amounts and types of conditioners required depending on variety of factors. These include both aqueous and surface chemistries of the sludge, and the physical properties of the suspended solids. Also important is the chemistry of any chemical conditioner used, and how it interacts with the biosolids."

The above statements and teachings from June 1995 and August 1996 are while the parent application for the instant claims, e.g. 08/721,557, was filed on 09/26/96 and the original patent application for the instant claims was filed on 04/06/98. Therefore, at the time of the instant patent application, "means by which chemical conditioners interact with the colloidal phase in biological suspensions to facilitate the release of water [was] poorly understood". This is while at the time of the instant patent application, Dentel 1995 and Chitikela 1996 demonstrate that "the optimal amounts and types of conditioners required depending on a variety of factors": 1) "aqueous and surface chemistries of the sludge", 2) "physical properties of the suspended solids, which are determined by characteristics of the original wastewater and by the operational parameters for the various treatment processes

employed with the plant", and 3) "the chemistry of any chemical conditioner used, and how it interacts with the Biosolids".

These teachings at the time of the instant patent application are while none of the cited references alone or in combination teach a "method for dewatering thermophilic biological sludge" comprising any of the factors. This is while the instant invention teaches for the dewatering of a thermophilic biological sludge, 1) "aqueous and surface chemistries of the sludge" in column 2:

Despite the disadvantages of mesophyllic bacteria, meso-
45 phyllic bacteria are preferable in relation to the dewatering
of digested sludge. Mesophyllic bacteria naturally secrete a
polysaccharide which acts as a tackifier providing a chemi-
cal mechanism of floc formation. This chemical mechanism
is an aid to traditional cationic polyacrylamides to begin the
50 dewatering process. However, thermophilic bacteria do not
secrete a tackifying polysaccharide. Furthermore, thermo-
philic bacteria naturally repel each other. This repelling
nature of thermophilic bacteria makes the dewatering of
sludge from the thermophilic digestion process expensive
55 and difficult.

The instant invention also teaches, 2) "physical properties of the suspended solids, which are determined by characteristics of the original wastewater and by the operational parameters for the various treatment processes employed with the plant" in column 2:

medium of microbial growth. At temperatures of at least
about 115° F., active bacteria are of the thermophilic variety.
Aerobic and/or anaerobic thermophilic microorganisms are
30 used to carry out any required degradation in a thermophilic,
exothermic process. The thermophilic digestion system
relies on high operating temperatures (greater than about 55°
C. or 131° F.) to achieve a substantial pathogen destruction.
While a fraction of the energy released from the thermo-
35 philic process is stored intracellularly to form new cells, a
larger fraction of the energy is released as heat into the
environment. The released heat is the major heat source used
to achieve the desired operating temperature. Experiments
have shown that between about 8,500 and 13,000 BTU are
40 released with the thermophilic digestion of one pound of
volatile solids (bacteria). By maintaining a sufficient tem-
perature for a required period of time, pathogenic organisms
are reduced to below detectable levels.

Lastly, the instant invention teaches, 3) "the chemistry of any chemical conditioner used, and how it interacts with the biosolids" in column 4:

The present invention relates to the dewatering of sludge
30 from biological treatment systems of wastewater treatment
facilities. Specifically, this invention is directed toward the
removal of water from sludge that has been digested by a
thermophilic digestion process. A chemical method is pre-
sented for the dewatering of biological sludge using
35 polyquaternary amine, aluminum sulfate, ferric chloride and
blends thereof as the primary component.

And, in columns 8 and 9:

In method five as well, the polymeric quaternary ammo-
nium compounds are from DADMAC family or from epi-
40 DMA family. In a preferred embodiment, the polymeric
quaternary ammonium compound, aluminum sulfate, ferric
chloride and blends thereof are added directly to the sludge
and, upon formation of microflocs of the sludge from the
polymeric quaternary ammonium compound, aluminum
45 sulfate, ferric chloride and blends thereof, a cationic poly-
acrylamide is added to form a floc that dewateres the sludge.
Preferably, ratios of the polymeric quaternary ammonium
compounds with respect to aluminum sulfate range from
about 1:16 to about 1:2 by weight. Ratios of the polymeric
50 quaternary ammonium compounds with respect to ferric
chloride range from about 1:8 to about 1:10 by weight.
Ratios of the polyacrylamide with respect to aluminum
sulfate range from about 1:80 to about 1:8 by weight. Ratios
of the polyacrylamide with respect to ferric chloride range
55 from about 1:70 to about 1:7 by weight.

Method five also involves a polymer concentration to
solids ratio of total polymer dosage requirement in relation-
ship to percentage of solids component of the sludge of
between about 50 ppm:1 percent and about 300 ppm:1
60 percent. The polymeric quaternary ammonium compound,
aluminum sulfate, ferric chloride and blends thereof are
added directly to the sludge, in an amount sufficient to cause
formation of a cationic overcharge within a developed
microfloc system, and an anionic polyacrylamide is then
65 added for final floc formation. In a preferred embodiment,
the polymeric quaternary ammonium compound and the
anionic polyacrylamide are in an approximately 1:8 to 20:1

ratio by weight. In a preferred embodiment, polymer con-
centration to solids ratio of total polymer dosage require-
ment in relationship to percentage of solids component of
the sludge is between approximately 50 ppm:1 percent and
approximately 5000 ppm:1 percent.

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Method five can also be used to treat a mixture of biological sludge with primary sludge. In addition, the polymeric quaternary ammonium compounds, aluminum sulfate, ferric chloride and blends thereof, as well as polyacrylamide, can be used in solution, in emulsion or in dry form. 10

Therefore, at the time of the instant patent application "means by which chemical conditioners interact with the colloidal phase in biological suspensions to facilitate the release of water was poorly understood", while it was known at the time of the instant patent application that three teachings were needed to understand said means, all of which are taught by Applicant, specifically:

1. "Aqueous and surface chemistries of the sludge",
2. "Physical properties of the suspended solids, which are determined by characteristics of the original wastewater and by the operational parameters for the various treatment processes employed with the plant", and
3. "The chemistry of any chemical conditioner used, and how it interacts with the biosolids".

Therefore, Applicant discovered "the source of the problem" and taught "the source of the problem" as taught in the instant invention. This is while "the source of the problem" to dewater thermophilic biosolids was not taught or suggested by others, as was required in the art.

The above is while Dentel 1995 further states on page 2 that:

"The success of any conditioning process will also depend on the specific dewatering process employed.

Thus, the conditioning process is **a multivariate problem with no simple strategy available for optimization.** At present, the required dosages for chemical conditioners must be determined empirically. With this being the case, **the use of multiple chemical additives becomes less feasible because of the difficulty in identifying a proper dosage combination.** (Emphasis added)

And, Chitikela 1996 further states that,

"The success of any conditioning process will also depend on the specific dewatering process employed. Thus, the sludge conditioning process is a multivariate problem with no simple strategy available for its optimization. At present, the required dosages for chemical conditioners must be determined empirically. With this being the case, the use of multiple chemical additives become less feasible because of the difficulty in identifying a proper dose combination."

Therefore, the instant claims could not have been obvious at the time of filing for the instant patent application; as:

1. Both Dentel 1995 and Chitikela 1996 taught not to practice the instant claims (teaching away),
2. There is no teaching or suggestion within any cited reference for the three required teachings in the dewatering of a thermophilic biological sludge; wherein, all three of the required teachings are accomplished by the instant invention (source of the problem), and
3. At the time of the instant patent application, it was "less feasible" to develop the instant claims due to the "difficulty" of a "multivariate problem". This teaching is presented for a traditional mesophilic biological sludge; therefore, the difficulty is enhanced and the feasibility is reduced with the further complication of a thermophilic biological sludge (undue experimentation to develop the instant claims).

In furtherance to the above "teaching away" argument and that the prior art does not "identify the source of the problem", Applicant refers the Examiner to a timely publication from the US EPA, a pre-eminent authority in wastewater treatment and in dewatering (this citation provided by Applicant in OAR dated 12/27/07). Specifically, the US EPA document TBS Prakasam, et al. *Effect of Recycling Thermophilic Sludge on the Activated Sludge Process*, EPA Project Summary 5, Sept. 1990 states under the heading of Dewaterability:

"Capillary suction time (CST) measurements at various polymer dosages indicated that mesophilic sludge required a lower polymer dosage than did the thermophilic sludge (10 vs. 22.5 kg/dry tonne) to achieve the minimum CST that was possible. The thermophilic sludge, however, exhibited highest floc strength than did the mesophilic sludge.

Pilot scale centrifuge studies confirmed that the thermophilic sludge required a higher polymer dosage than did the mesophilic sludge. At optimal polymer dosages, those studies also indicated that the mesophilic sludge approached 100% solids capture whereas the thermophilic solids approached a maximum of 96% solids capture. The lower solids capture with thermophilic sludge probably resulted from the higher concentration of fine particles in it than in the mesophilic sludge."

In contrast and in solution to the US EPA cited challenge, Applicant refers the Examiner to Example 9 of the instant specification, which is located in col. 11 lines 10 to 33.

In addition, the US EPA report goes on to recommend that:

“Based on the lack of effect on sludge mass and the increase in digestion capability required, the Torpsy process is not recommended for Chicago’s conventional rate activated sludge plants. Nor is thermophilic digestion as the terminal sludge digestion process recommended if the sludge is to be used at a site with nearby neighbors.”

Therefore, the US EPA, **a pre-eminent authority** (e.g. one of expert skill in the art and of much greater skill than one of ordinary skill in the art) was not able to practice the instant claims from the available teachings, e.g. the Examiner’s citations, at the time of the instant patent application. Therefore, it was not obvious to condition a thermophilic biological sludge with an iron or an aluminum salt prior to the use of a cationic or an anionic polyacrylamide.

Nielson or Haase in view of Field

Applicant respectfully refers the Examiner to the above arguments in relation to Dentel 1995 and Chitkela 1996.

The above is in addition to the fact that Field does not teach or suggest the dewatering of thermophilic bio-solids, any bio-solid or of any sludge. In strong contrast to the instant claims, Field teaches the removal of phosphates from water, as stated by the Examiner. Specifically, in the abstract, Field states:

Phosphate is removed from an aqueous medium by adding inorganic coagulant followed by a cationic polyelectrolyte which is a water-soluble quaternary ammonium salt of a high molecular weight copolymer of acrylamide and an alkylaminoalkyl ester of acrylic or methacrylic acid. The process is of particular value in reducing the phosphate content of sewage effluent.

Further, Field states in column 1:

In the treatment of sewage and other aqueous wastes, (i.e. waste waters) generally two distinct areas of solid/-liquid separation are recognised.

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The first of these concerns the removal of solid constituents from the bulk liquid effluent with the object of

producing a purified aqueous liquid effluent which may or may not require further purification before discharge or re-use. Examples of this are primary or secondary sedimentation processes, filtration processes and flotation processes. 15

The solids removed in such processes usually are associated with an appreciable quantity of water but because of their nature and consistency they are classified as sludges. The further dewatering of such sludges may also be by sedimentation, filtration, flotation or centrifugation but constitutes a somewhat different and often more difficult technology which is commonly referred to as sludge dewatering. 20 25

Whilst it is true to say that there are certain common features between the two, for instance in relation to the site of operation, nevertheless in practice the overall techniques, handling methods, reagent dosages and reagent types are usually quite different for the two areas. 30

There is often some confusion in the patent literature concerning these two areas and accordingly it is to be stated that the usage of the present invention is connected with technology of the first area, i.e., bulk effluent treatment and not at all with the second area i.e., sludge dewatering. This will be readily apparent to those skilled in the art. 35

Emphasis added.

Therefore, Field specifically states that "the usage of the present invention is connected with technology of the first area, i.e., bulk effluent treatment and not at all with the second area i.e., sludge dewatering". Field directly and specifically teaches away from the instant claims.

For one of ordinary skill in the art to have developed the instant claims from the citations referenced by the Examiner at the time of the instant patent application, one of ordinary skill in the art would have had to: 1) apply Nielson or Haase to the dewatering of thermophilic bio-solids, while, 2) replacing a low molecular weight polymer in Nielson or Haase with a salt, which is not taught or suggested in Nielson or Haase, 3) ignore the teachings of Dentel 1995 and apply the use of an iron (or an aluminum salt) as a preconditioner to the thermophilic biological sludge prior to use of a cationic or an anionic polyacrylamide anyway, 4) ignore the teachings of Chitikela 1996 and apply the use of an iron (or an aluminum salt) as a preconditioner to the thermophilic biological sludge prior to use of a cationic or an anionic polyacrylamide anyway, and 5) apply Field in an application for which Field states is not an application within the Field patent.

Applicant would like to respectfully present to the Examiner that such an irrational path is not a path for one of ordinary skill in the art; or quite frankly, for one of expert skill in the art. There are just too many irrational decisions which must be made with the cited references at the time of the instant patent application without having the teaching and/or understanding of the source of the problem as taught in the instant invention. Most importantly, obviousness to try applies to teachings for the same purpose. At the time of the instant patent application, there was no obviousness to try the pre-conditioning of ANY biological sludge with an iron or aluminum salt prior to the use of a cationic polyacrylamide due to the teachings of Dentel 1995 and Chitikela 1996.

This is while **it would have been obvious to one of ordinary skill in the art that the dewatering of thermophilic bio-solids is a "different purpose" than the removal of phosphates from a bulk liquid and that the US EPA, a preeminent authority taught, at that time, that thermophilic bio-solids are difficult to dewater. Again, Field is for a different purpose than the instant claims, e.g. phosphates while the instant claims are for thermophilic bio-solids.**

Given the requirements of rather irrational decision making for one of ordinary skill in the art at the time of the instant patent application to develop the instant claims, Applicant would like to suggest that the Examiner's cited combination is "hindsight reconstruction", ref. MPEP 2141.01 III and KSR International v. Teleflex, Inc. et al., No. 04-1350, 550 U.S. __ (2007).

Non-Obviousness

Applicant has respectfully presented relevant facts which demonstrate that the hypothetical person having ordinary skill in the art would not have found the invention as a whole obvious at the time of the instant patent application. Specifically, Applicant has respectfully demonstrated to the Examiner:

1. **The scope and content of the prior art** - Notable references taught away from the instant claims at the time of the instant patent application, while teaching that the instant claims would require undue experimentation. This is while notable references teach knowledge of three factors as important to understand the dewatering of bio-solids. None of the cited references teach the three factors in the dewatering of thermophilic bio-solids; this is while, the instant patent does.
2. **The differences between the prior art and the claims at issue** - The prior art of record does not teach the "source of the problem" or "a method to dewater

thermophilic biosolids". This is while, the prior art of record establishes three required teachings in relation to the dewatering of biosolids; after which, Applicant is the first to have met the three required teachings within the instant invention and as claimed within the instant claims. Further, many prior art citations are for a different purpose than the instant claims.

3. **The level of ordinary skill in the pertinent art** – At the time of the instant patent application and relating to those of ordinary skill in the art, a pre-eminent authority, one of expert skill in the art - the US EPA, taught away from the instant claims. Therefore, it is obvious that the instant claims would not have been obvious to the hypothetical person having ordinary skill in the art at the time of the instant patent application.

Instant Patent Application is a Continuation in Part of a Common Cited Reference

As referenced in paragraph 21 of the instant patent, patent application 09/055,870, as filed on 04/06/98, is the patent application for the instant patent; and as referenced in paragraph 63 of the instant patent, patent application 09/055,870 is also a continuation in part of 08/721,557, which is the patent application for Examiner's Cited Reference Haase '435, e.g. U.S. Pat. No. 5,846,435. This is while Haase '435 did not issue until 12/08/98. Therefore, while the instant patent is a continuation-in-part of a common cited reference, Haase '435, one of ordinary skill in the art would not have had Haase '435 available at the time of Applicant's filing 09/055,870 (Haase '435 was not available until its issuance; also, this is a time prior to US PTO publication of patent applications. Therefore, Haase '435 issued after the filing of patent application 09/055,870).

Applicant Requests Claim Allowance

Applicant has respectfully traversed all of the Examiner's rejections. Applicant herein respectfully requests an allowance of claims 1 – 13, 15 – 20 and 39 as presented herein.

CONCLUSION

Applicant respectfully requests entry of this OAR and amendment, along with favorable reconsideration of the pending claims. Applicant has respectfully provided to the Examiner numerous facts and argument which support allowance of the presented claims. Specifically, Applicant has respectfully provided to the Examiner relevant facts and argument relating to:

1. Teaching away by notable published references at the time of the instant patent application,
2. Discovery of the source of the problem, as evidenced in the instant application and required by notable published references at the time of the instant patent application; while,
3. The Citations do not teach the source of the problem.
4. Hindsight reconstruction in use of the Citations when taken in context with notable publications at the time of the instant patent application,
5. A different purpose for many of the Citations as compared to the instant claims,
6. The instant patent is a continuation-in-part of a common cited reference, e.g. Haase,
7. Haase did not publish prior to filing of the patent application for the instant patent, and
8. Copying and commercial success by others, as evidenced in secondary considerations.

Applicant believes this amendment to place the presented claims in condition for allowance. Applicant requests that this office action response and amendment be entered; and after due consideration of the facts presented herein, the presented claims be allowed and a certificate be issued.

To facilitate the resolution of any issues or questions presented by this paper, Applicant respectfully requests that the Examiner directly contact the undersigned by phone to further discussion, reconsideration and allowance of the claims.

Respectfully submitted,



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